

This file provides information about the T1 Mapping image sets in the B1_Correction QIBA series (version 13).

This data set is similar to version 5, except that it simulates B1 inhomogeneity correction.

There are several different schemes used to correct for B1 inhomogeneity. We simulate two double-angle correction schemes: (60-120 and 120-240) and (60-180 and 120-180). The output of these images is the B1 correction images. Four sets of T1 Mapping and dynamic images were made by adjusting the nominal flip angle by $\pm 10\%$ and $\pm 20\%$ to give the actual flip angle.

Two sets of images are provided for each series. DICOM part 10 format images are in the DICOM directory. XML files are in the XML directory. The XML images allow the values for the DICOM tags to be altered using a text editor, and new DICOM images can then be generated using dcm4che's tool called "xml2dcm," available at <http://www.dcm4che.org/confluence/display/d2/dcm4che2+DICOM+Toolkit>.

The parameters used to generate the data are:

Repetition Time = 5 msec
Assumed T1 (in tissue) = 1000 msec
Assumed equilibrium magnetization (in tissue) = 50000
Assumed T1 (in blood vessel) = 1440 msec
Assumed equilibrium magnetization (in blood vessel) = 50000

The correction factors used are {0.8, 0.9, 1.1, 1.2} (i.e. {-20%, -10%, +10%, +20%}).

The signal intensity images were generated for the following different nominal flip angles: 3, 6, 9, 15, 24, 35 degrees. These flip angles were multiplied by the correction factor to give the actual flip angles. The files in the T1 Mapping folders have the following names:

filename	Nominal flip angle (in degrees)
fa3	3
fa6	6
fa9	9
fa15	15
fa24	24
fa35	35

The JSim model T1_S0_B1_mapping_model_20150608.proj was used to generate the T1 mapping signal intensity images. This model is available on the QIBA page of our website. A link to the JSim website is also provided.

The signal intensity for the T1 mapping images was calculated using Equation 1 in the paper Comparison of three physiologically-based pharmacokinetic models for the prediction of contrast agent distribution measured by dynamic MR imaging, Barboriak DP, MacFall JR, Viglianti BL, Dewhirst MW. J Magn Reson Imaging. 2008 Jun;27(6):1388-98.

The data sets are organized as follows: Each correction factor is in its own folder, with the dynamic, T1 Mapping, and EPI_SEG images contained in subfolders within these correction factor folders. The naming convention for the correction factor folders is "B1_Correction_<CF>Percent_<Creation date>" where <CF> is the correction factor and <Creation date> is the date when the images were created. Thus, the folder "B1_Correction_+10Percent_20150721" has a correction factor of +10% (1.1) and was created on July 21, 2015.

The folders with the dynamic images are titled "QIBA_Dyn_<Creation date>".

The data in the T1 mapping test image is organized as follows: The top 50*70 pixels in the image represent the tissue. The vascular region of interest is the bottom 50*10 pixels strip of the image.